AMENDMENTS TO THE CLAIMS

Claims 1-15. (Canceled).

16. (Currently Amended) A method of providing ~~for fabricating~~ a molecular wire transistor comprising a pair of crossed wires, ~~at least one of said wires comprising a doped semiconductor material,~~ said method comprising:

providing a first said wire having a first conductivity type, wherein said first wire comprises a semiconductor material,

providing a second said wire with either Lewis acid functional groups or Lewis base functional groups to provide said second wire with a second conductivity type opposite to that of said first wire, and

causing said pair of wires to cross, thereby forming a junction with modulation doping where one wire crosses another, wherein a dimension of said first wire in the direction of the shortest line between said pair of crossed wires is nanoscopic.

17. (Canceled).

18. (Currently Amended) The method of Claim 16 [[17]] wherein the other wire is nanoscopic or larger in the direction of the shortest line between the two wires.

19. (Original) The method of Claim 16 wherein one of said wires comprises N-doped semiconductor and the other wire comprises P-doped semiconductor.

20. (Original) The method of Claim 19 wherein one wire of a given doping induces a base region by modulation doping in said other wire around said junction, thereby defining emitter and collector regions on either side of said base region in said other wire.

21. (Currently Amended) The method of Claim 20 wherein said emitter and collector regions comprise P-type dopant and said base region comprises N-type dopant ~~a PNP bipolar transistor is formed~~.

22. (Currently Amended) The method of Claim 20 wherein said emitter and collector regions comprise N-type dopant and said base region comprises P-type dopant ~~an NPN bipolar transistor is formed~~.

23. (Currently Amended) The method of Claim 16 wherein said second ~~one of said wires comprises doped semiconductor and the other~~ wire comprises a metal.

24. (Original) The method of Claim 23 wherein said functional groups on said metal wire comprise a first portion that is electrically insulating and extends from said metal wire and a second portion joined to said first portion comprising said Lewis acid or base functional group and wherein said metal wire induces a gate region in said doped semiconductor wire around said junction, thereby defining source and drain regions on either side of said gate region in said other wire.

25. (Original) The method of Claim 24 wherein an N-channel field effect transistor is formed.

26. (Original) The method of Claim 24 wherein a P-channel field effect transistor is formed.

27. (Previously Presented) The method of Claim 16 wherein said second wire also comprises a semiconductor material and wherein both said semiconductor wires are provided with functional groups, one said wire being provided with Lewis acid functional groups and the other said wire being provided with Lewis base functional groups.

28. (Original) The method of Claim 16 wherein either said Lewis acid functional groups or said Lewis base functional groups have two distinct oxidation-reduction states, a conductive state and a relatively insulating state with a large I-V hysteresis separating the two states, to form a state change transistor or a switch that is capable of being set by application of a voltage that is larger than the voltage at which the transistor operates.

29. (Original) The method of Claim 28 wherein said state change is set, thereby forming a transistor.

30. (Original) The method of Claim 28 wherein said state change is not set, thereby forming either an open or closed switch.

Claims 31-46. (Canceled).

47. (New) The method of Claim 16 wherein external coatings on said first and second wires provide said modulation doping.

48. (New) The method of Claim 47 wherein said external coatings comprise P-type coatings.

49. (New) The method of Claim 47 wherein said external coatings comprise N-type coatings.

50. (New) The method of Claim 16 wherein said dimension is in the range of more than approximately 0.1 nanometers to less than approximately 50 nanometers.

51. (New) A method of providing a molecular wire transistor comprising a pair of crossed wires, at least one of said wires comprising a doped semiconductor material, said method comprising:

providing a first wire having a first conductivity type and an external coating, and

providing a second wire that crosses said first wire, said second wire having a second conductivity type opposite that of said first wire, said second wire having an external coating selected from either Lewis acid functional groups or Lewis base functional groups, wherein a junction with modulation doping is formed where said first and second wires cross, said modulation doping provided by said external coatings of said first and second wires.